

## ABSTRACT OF THE DISCLOSURE

A compact atomic oscillator with improved frequency stability. A voltage-controlled oscillator  
5 generates an oscillation signal based on a given control voltage, and a modulator modulates it with a low-frequency signal. A phase-locked loop (PLL) upconverts the modulated oscillation signal directly to a first frequency in atomic resonance frequency band. The first frequency is an  
10 integer multiple of the oscillation signal. A frequency synthesizer produces a second frequency specified by a frequency setting unit, and a mixer combines the first and second frequencies to produce an RF signal for driving an atomic resonator. The amount of discharge lamp light  
15 passing through the atomic resonator depends on the difference between RF signal frequency and atomic resonance frequency. This quantity is measured as a resonance detection signal, and a frequency controller applies it to synchronous detection to produce a control  
20 voltage for the voltage-control oscillator.